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Further taxonomic notes on the jumping spider *Synemosyna maddisoni* Cutler, 1985 (Araneae: Salticidae)

Дальнейшие таксономические сведения о пауке-скакунчике *Synemosyna maddisoni* Cutler, 1985 (Araneae: Salticidae)

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KEY WORDS: Aranei, Mexico, diagnosis, *pars pendula*, redescription.

КЛЮЧЕВЫЕ СЛОВА: Aranei, Мексика, диагноз, *pars pendula*, переописание.

ABSTRACT: We examined a set of salticids from southern Mexico, all of them subsequently assigned to *Synemosyna maddisoni* Cutler, 1985, which has not been illustrated since the original description. Therefore, we have provided detailed micrographs of the copulatory organs of both sexes and remarks on the male palpus, which has a simple embolus with *pars pendula* and an apical sclerite. Moreover, we have emended the diagnosis taking in account the resemblance with *S. ubicki* Cutler, 1988 which was described after the original description of *S. maddisoni*.

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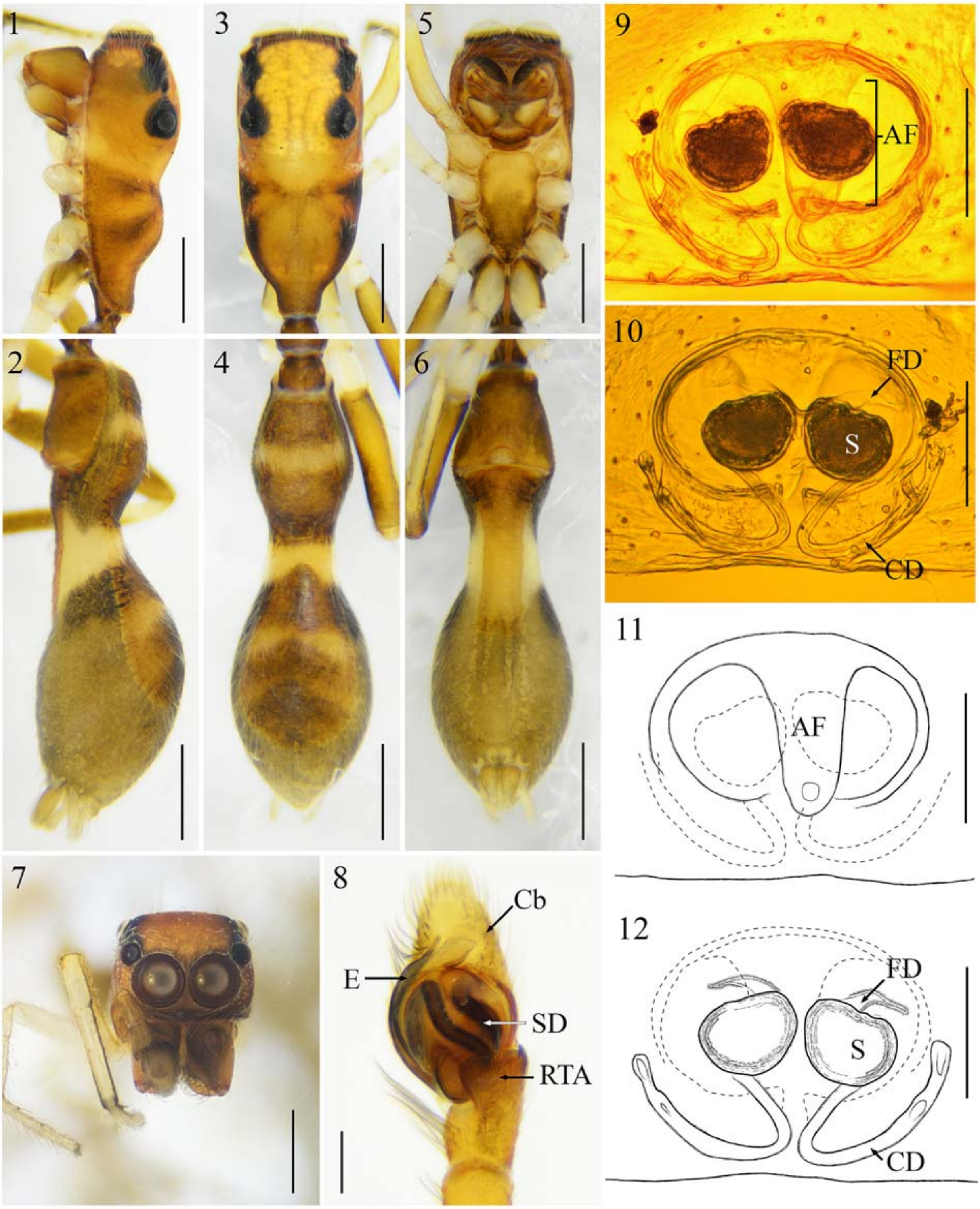
РЕЗЮМЕ: Мы исследовали подборку сальтицид из южной Мексики и отнесли их к *Synemosyna maddisoni* Cutler, 1985, который никогда не иллюстрировался после первоописания. Поэтому мы публикуем детальные микрофотографии копулятивных органов обоих полов и даем заметки о пальпусе самца, в котором имеется простой эмболюс с *pars pendula* и апикальный склерит. Более того, мы также уточнили диагноз вида с учетом его сходства с *S. ubicki* Cutler, 1988, видом, который был описан после описания *S. maddisoni*.

Introduction

Synemosyna Hentz, 1846 is an American spider genus with 17 species distributed from the United States to Argentina [Galiano, 1966; Richman *et al.*, 2012; WSC, 2020]. They and the closely related *Sympolymnia* Perger et Rubio, 2020 usually resemble *Pseudomyrmex* or *Crematogaster* ants [Cutler, 1985, 1988; Galiano, 1966; Maddison, 2015; Perger, Rubio, 2020]. This resemblance by *Synemosyna* species is seen in morphological modifications such as elongate bodies, usually constricted carapace and abdomen, and slender legs. Some species are polymorphic and therefore resemble more than one ant model and some even mimic the ant locomotory behaviour [Cutler, 1985; Galiano, 1966; Oliveira, 1988; Reiskind, 1977]. Three species of *Synemosyna*: *S. americana* (Peckham et Peckham, 1885), *S. decipiens* (O. Pickard-Cambridge, 1896) and *S. maddisoni* Cutler, 1985; and one from the recently described genus *Sympolymnia*, *S. edwardsi* (Cutler, 1985) are known from Mexico (Fig. 24). Most *Synemosyna* species are rare in collections because in the field they are easily overlooked due to their myrmecomorphy. Here, we provide novel morphological information of the copulatory organs of both sexes of *S. maddisoni*, and update its diagnosis.

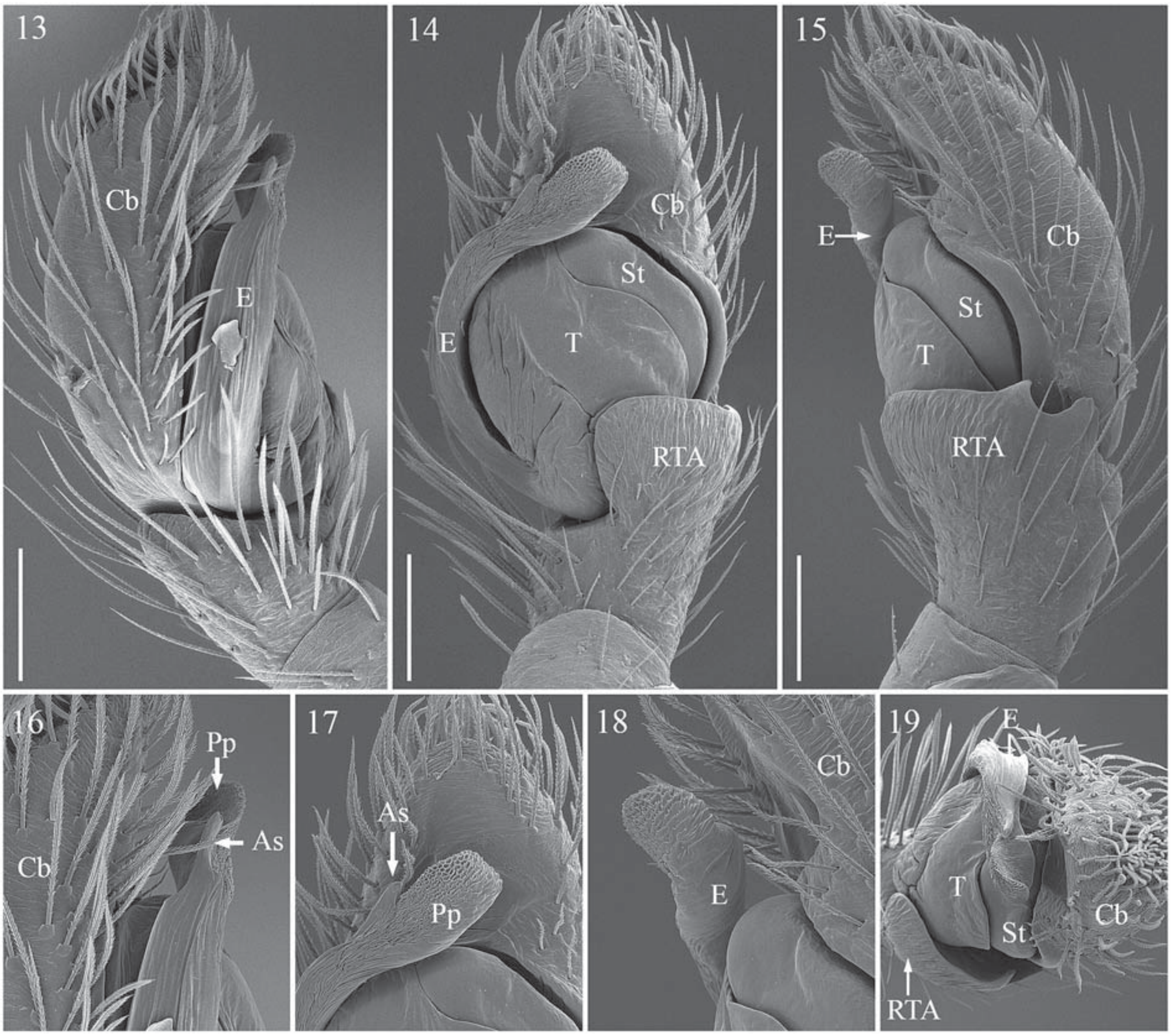
Material and methods

Specimens were measured by means of an ocular micrometer of an Olympus SZX16 stereomicroscope. The epigyne was cleared with methyl salicylate. Photographs were taken with a Nikon 5200 camera attached to a Zeiss Primo Star microscope; Helicon Focus software was used for image stacking. Scanning electron micrographs were taken with a TOPCON SM-510 at El Colegio de la Frontera Sur, Tapachula, following the procedures and methods described in Alvarez-Padilla & Hormiga [2008]. Colour descriptions are based on the specimens preserved in 96% ethanol. All the specimens studied are deposited in the Colección de Arácnidos del Sureste de México, Tapachula, Chiapas, Mexico (ECOTAAR; curator: G. Ibarra-Núñez). The format of description follows Galiano [1963, 1966], except for legs of which measurements are presented as follows: total length (femur, patella, tibia, metatarsus, tarsus); all measurements are in millimeters. General terminology follows Ramirez [2014], spine notation follows Petrunkevitch [1925]. Ab-



Figs 1–12. *Synemosyna maddisoni* Cutler, 1985: 1, 2 — male habitus, lateral view; 3, 4 — ditto, dorsal view; 5, 6 — ditto, ventral view; 7 — ditto, frontal view; 8 — left male palp, ventral view; 9, 11 — epigyne, ventral view, 10, 12 — vulva, dorsal view. Scale bars: 0.5 mm (1–7), 0.1 mm (8–12). Abbreviations as explained in 'Material and Methods'.

Рис. 1–12. *Synemosyna maddisoni* Cutler, 1985: 1, 2 — габитус самца, вид сбоку; 3, 4 — то же, вид сверху; 5, 6 — то же, вид снизу; 7 — то же, вид спереди; 8 — левая пальпа самца, вид снизу; 9, 11 — эпигина, вид снизу, 10, 12 — вульва, вид сверху. Масштаб: 0,5 мм (1–7), 0,1 мм (8–12). Сокращения как объяснено в 'Материалах и Методах'.



Figs 13–19. *Synemosyna maddisoni* Cutler, 1985: 13 — left male palp, prolateral view; 14 — ditto, ventral view; 15 — ditto, retrolateral view; 16 — apical division, prolateral view; 17 — ditto, ventral view; 18 — ditto, retrolateral view; 19 — ditto, apical view. Scale bars: 0.1 mm. Abbreviations as explained in 'Material and Methods'.

Рис. 13–19. *Synemosyna maddisoni* Cutler, 1985: 13 — левая пальпа самца, вид спереди-сбоку; 14 — тоже, вид снизу; 15 — тоже, вид сзади-сбоку; 16 — апикальный раздел, вид спереди-сбоку; 17 — тоже, вид снизу; 18 — тоже, вид сзади-сбоку; 19 — тоже, вид спереди. Масштаб: 0,1 мм. Сокращения как объяснено в 'Материалах и Методах'.

breviations used in the text and figures are as follows: AF — anterior flap, As — apical sclerite of the embolus (*sensu* Comstock [1910]), Cb — cymbium, CD — copulatory duct, D — described, E — embolus, FD — fertilization duct, Pp — *pars pendula*, RTA — retrolateral tibial apophysis, S — spermatheca, SD — sperm duct, St — subtegulum, T — tegulum.

Taxonomy

Salticidae Blackwall, 1841
Synemosyna Hentz, 1846

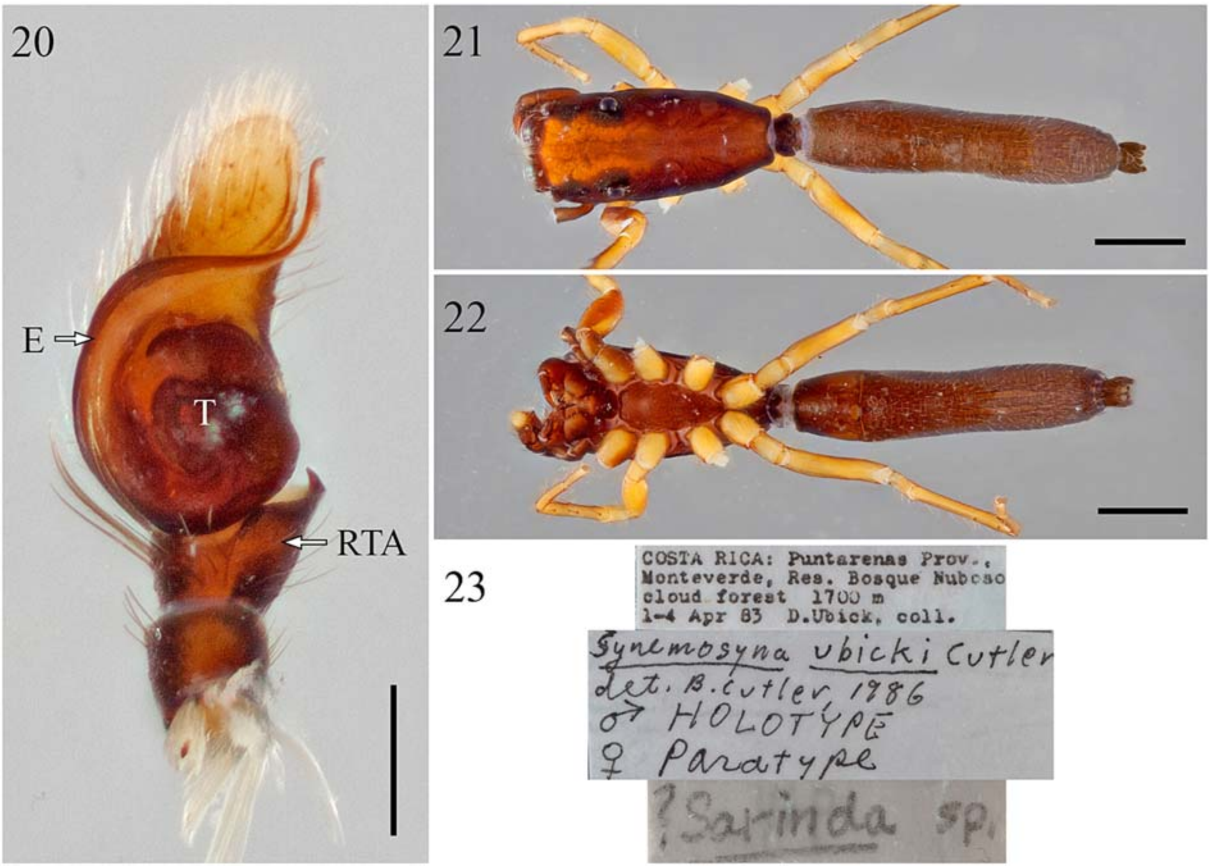
Synemosyna maddisoni Cutler, 1985
Figs 1–19

Synemosyna maddisoni Cutler, 1985: 89, figs 19–22 (D♀). Holotype ♀ from MEXICO, Chiapas, c. 10 km SW of Ococingo on the road to Oxchuc, 16°09′N, 92°02′W, 29.VII.1983, W. Maddison & R.S. Anderson; deposited in the Museum of Comparative Zoology, Cambridge, USA; not examined.

Synemosyna maddisoni: Cutler, 1988: 199, figs 1–2, 5–6 (♂).

MATERIAL. MEXICO: *Chiapas*: 1 ♂ (ECOTAAR-11463), Municipio de Cacahoatán, Ejido Alpujarras (15°4′20.76″N, 92°9′57.00″W), 922 m a.s.l., hand collecting in leaf-litter of shade-grown coffee, 20.02.2018, D. Chamé; 1 ♂ (ECOTAAR-2859), Municipio de Tapachula, Finca Irlanda (15°10′23″N, 92°20′10″W), 830–1100 m a.s.l., 28.03.2003, G. Ibarra; 1 ♂ (ECOTAAR-2456), same locality, 18.10.1988, G. Ibarra; 1 ♂ (ECOTAAR-2733), same locality, 8.08.1999, J.A. García; 1 ♂, 1 ♀ (ECOTAAR-2512, 2506), same locality, 9.01.1990, J.A. García; 1 ♂, 1 ♀ (ECOTAAR-2497, 2503), same locality, 7.12.1989, J.A. García; 1 ♀ (ECOTAAR-2769), same locality, 7.09.1999, J.A. García.

DIAGNOSIS. The epigyne of *S. maddisoni* resembles those of *S. americana* and *S. ubicki* Cutler, 1988 in having an anterior flap, but *S. maddisoni* has a U-shaped flap (Figs 9, 11) while in *S. americana* it is wide and short (cf. fig. 53



Figs 20–23. *Synemosyna ubicki* Cutler, 1988: 20 — left male palp, ventral view; 21 — male habitus, dorsal view; 22 — ditto, ventral view; 23 — holotype data labels. CAS TYPE CATALOG: 16496 by the California Academy of Sciences used under CC BY-NC-SA 4.0. Scale bars: 0.25 mm (20), 1 mm (21–22). Abbreviations as explained in 'Material and Methods'.

Рис. 20–23. *Synemosyna ubicki* Cutler, 1988: 20 — левая пальпа самца, вид снизу; 21 — габитус самца, вид сверху; 22 — тоже, вид снизу; 23 — этикетки голотипа. CAS TYPE CATALOG: 16496 лицензия Калифорнийской академии наук CC BY-NC-SA 4.0. Масштаб: 0,25 мм (20), 1 мм (21–22). Сокращения как объяснено в 'Материалах и Методах'.

in Galiano [1966]) and in *S. ubicki* slender and long (cf. fig. 9 in Cutler [1988]). In the shape of RTA, the males of *S. maddisoni* resemble those of *S. ubicki*, but the former has RTA extended ventrally (Figs 8, 14–15, 19) and the embolus is shorter than that in *S. ubicki* (*vs.* the embolus longer, almost reaching the cymbial tip in *S. ubicki*, cf. Fig. 20 and figs 7–8 in Cutler [1988]).

DESCRIPTION**.** General appearance as described in Cutler [1985, 1988]. Male habitus as in Figs 1–7 (ECOTAAR-11463). Colouration. Carapace with its anterior part yellowish, with black around eyes; posterior part brownish, with subtriangular dark brown spots on margins (Figs 1, 3). Abdomen with three transverse brown stripes that are separated by two pale yellow stripes, followed by two brown chevrons (Figs 2, 4). Legs pale yellow, with brown femora, except leg II. Tibia I and basal half of metatarsus I with lateral brown stripes. Tibia IV brown and metatarsus IV with retrolateral brown stripe. Lateral patches of white scales at carapace median depression and abdominal constriction (Figs 3–4). The dorsal scutum covers roughly 80% of abdomen (Figs 2, 4), post-epigastric scutum covers less than a half of abdominal length (Fig. 6). Chelicerae with four retromarginal denticles and one tooth and one promarginal denticle. Embolus thick and long, encircling a half of bulb (begins at 6 o'clock, ending at 12 o'clock), with a well-developed *pars pendula* extending beyond the truncus (Figs 8, 13–17, 19) and a spine-like, apical sclerite (Figs 16–17). Subtegulum crescent-shaped (Fig 14). RTA large, extending ventrally, with a retrolateral notch (Figs 8, 14–15, 19). Total length 4.09; carapace 1.81 long, 0.81 wide, 0.65 high at PLE; abdomen 2.28 long, 0.75 wide. Ocular quadrangle length 0.71, first row width 0.63, second row width 0.76, third row width 0.69, fourth row width 0.78. Distances AME–ALE 0.06, ALE–PME 0.15, PME–PLE 0.15. Diameter of AME 0.31, ALE 0.13, PME 0.05, PLE 0.12. Cheliceral length 0.35, clypeal height 0.10. Length of leg segments: I 2.24 (0.71, 0.29, 0.58, 0.38, 0.28), II 1.95 (0.59, 0.22, 0.51, 0.36, 0.27), III 2.35 (0.74, 0.23, 0.60, 0.51, 0.27), IV 3.16 (0.94, 0.28, 0.90, 0.73, 0.31). Spination: tibiae I–II v2-2-2; III–IV v0-1-1; metatarsi I–II v2-0-2; III–IV v1-2-2.

Female (ECOTAAR-2506). Colouration faded due to preservation. Dorsal scutum covers only a third of abdominal length and without a post-epigastric scutum. Epigyne with transversal, oval-shaped atrium (Figs 9, 11), the anterior border developed as an overhanging, tongue-shaped flap (Figs 9, 11: AF), rounded spermathecae almost touch each other (Figs 10, 12), copulation duct long and slender, fertilization ducts arise anteriorly at spermathecae (Fig 12). Total length 5.02; carapace 2.1 long, 0.86 wide, 0.64 high at PLE; abdomen 2.92 long, 0.78 wide. Ocular quadrangle length

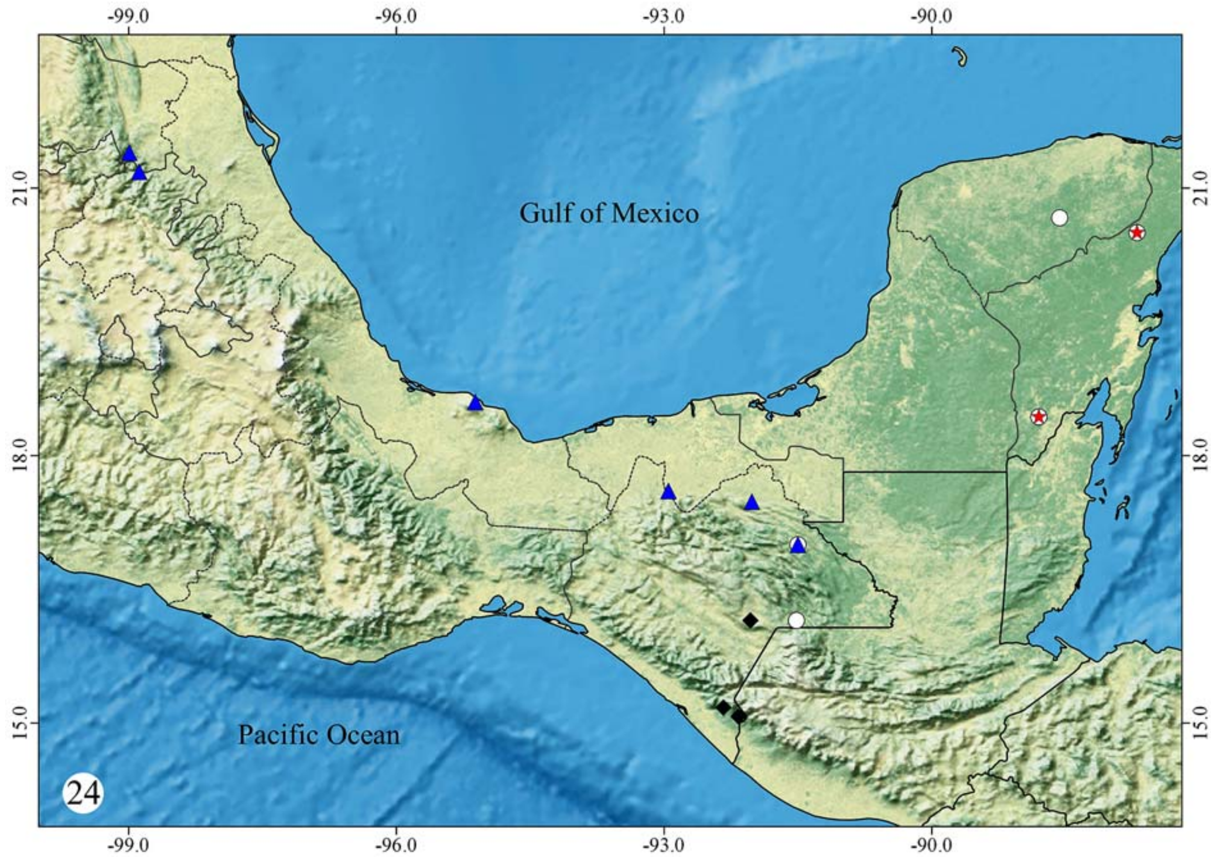


Fig. 24. Collecting localities of *Synemosyna* and *Sympolymnia* species (Salticidae) in Mexico: blue triangle — *Synemosyna decipiens*; white circle — *S. americana*; black diamond — *S. maddisoni*; red star — *Sympolymnia edwardsi*.

Рис. 24. Точки сборов видов *Synemosyna* и *Sympolymnia* (Salticidae) в Мексике: голубой треугольник — *Synemosyna decipiens*; белый кружок — *S. americana*; черный ромб — *S. maddisoni*; красная звезда — *Sympolymnia edwardsi*.

0.77, first row width 0.69, second row width 0.83, third row width 0.76, fourth row width 0.85. Distances AME–ALE 0.06, ALE–PME 0.15, PME–PLE 0.13. Diameter of AME 0.26, ALE 0.14, PME 0.05, PLE 0.15. Cheliceral length 0.19, clypeal height 0.06. Length of leg segments: I 2.23 (0.72, 0.26, 0.58, 0.40, 0.27), II 2.11 (0.68, 0.23, 0.53, 0.40, 0.27), III 2.58 (0.81, 0.26, 0.69, 0.54, 0.28), IV 3.45 (1.09, 0.33, 0.97, 0.77, 0.29). Spination of forelegs as in the male, hindlegs spineless.

VARIATION. Males (n=6) usually with one spine missing at retrolateral side of tibiae or metatarsi III–IV; total length 4.46±0.36; carapace 2.04±0.15 long, 0.91±0.09 wide; abdomen 2.42±0.22 long, 0.72±0.09 wide. Females (n=3) hindlegs without spines; total length 4.92±0.11; carapace 2.06±0.06 long, 0.85±0.01 wide; abdomen 2.85±0.05 long, 0.78±0.03 wide.

DISTRIBUTION. Mexico (Fig. 24): Chiapas [Cutler, 1988; present data], and Guatemala: Jalapa [Cutler, 1988], Izabal [GBIF, 2019] and Petén [GBIF, 2019].

HABITAT. This species occurs in shade-grown coffee plantations (830–1100 m a.s.l.), disturbed oak-pine (1066 m a.s.l.) and oak forests [Cutler, 1985, 1988; present data].

REMARKS. Cutler [1988] did not mention that *S. maddisoni* has a *pars pendula*, although he illustrated a darker outer margin of the embolus. An embolus with *pars pendula* is a character shared by *S. maddisoni* with *S. ankeli* Cutler et Müller, 1991 (fig. 5 in Cutler & Müller [1991]) and *S. ubicki* (inferred with photos of the holotype, Fig. 20 [California Academy of Sciences used under CC BY-NC-SA 4.0, catalog: 16496, Record Id: e5570efd-6c1b-4f94-b9ea-59296af7af5d]). Even though a post-epigastric scutum and spines on hindlegs were not mentioned for *S. ubicki*, the holotype has both characters (Fig. 22), as does the male of *S. maddisoni*. Most records of *Synemosyna* species in México originated from the southern region (Fig. 24), although records from online databases (GBIF, Portal de Datos Abiertos UNAM) suggest that the genus is also distributed in the west of the country. Richman & Cutler [2008] stated that *S. americana* is distributed in Tabasco and *S. decipiens* in Campeche, but we failed to find these records (with references) in the reviewed papers.

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Compliance with ethical standards

Conflict of Interest: The authors declare that they have no conflict of interest.

Ethical approval: No ethical issues were raised during our research.

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